

REMARKS

Prior to entry of this amendment, claims 1-19 are pending in the subject application. By this amendment, claim 13 has been canceled without prejudice or disclaimer of any of the subject matter contained therein.

Applicants note with appreciation the Examiner's acknowledgement of applicants' claim for foreign priority and receipt of a certified copy of the priority document.

Applicants further note with appreciation the Examiner's acceptance of the drawings filed on September 8, 2003.

Applicants further note with appreciation the Examiner's consideration of applicants' Information Disclosure Statement filed on September 8, 2003.

A. Introduction

In the outstanding Office action, the Examiner rejected claims 1, 5, 6, 8, 10, 14, and 16-18 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,993,314 to Lim et al. (hereinafter referred to as "the Lim et al. reference") in view of U.S. Patent Application Publication No. 2003/0114129 to Jerng (hereinafter referred to as "the Jerng reference") and U.S. Patent No. 6,215,988 to Matero (hereinafter referred to as "the Matero reference"); rejected claims 2, 3, 9, and 15 under 35 U.S.C. § 103(a) as being unpatentable over the Lim et al. reference, the Jerng reference, the Matero reference, and further in view of U.S. Patent No. 5,929,716 to Komori et al. (hereinafter referred to as "the Komori et al. reference"); rejected claims 4 and 7 under 35 U.S.C. § 103(a) as being unpatentable over the Lim et al. reference, the Jerng reference, the Matero reference, and further in view of U.S. Patent No. 5,929,708 to Davis et al. (hereinafter referred to as "the Davis et al. reference"); rejected claims 11, 12, and 19 under 35 U.S.C. § 103(a) as being unpatentable over the Lim et al. reference in view of the Komori et

al. reference; and rejected claim 13 under 35 U.S.C. § 103(a) as being unpatentable over the Lim et al. reference in view of the Jerng reference.

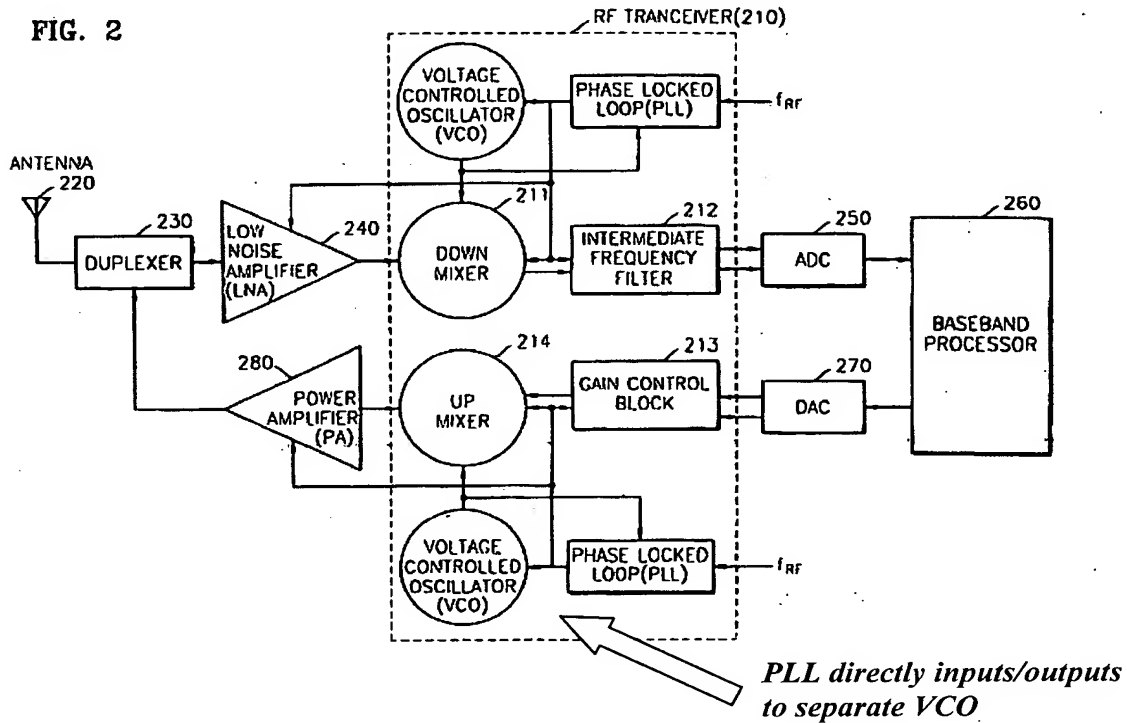
Applicants respectfully traverse these rejections for at least the reasons set forth below.

B. Asserted Obviousness Rejection of Claims 1, 5, 6, 8, 10, 14, and 16-18

In the outstanding Office action, the Examiner rejected claims 1, 5, 6, 8, 10, 14, and 16-18 under 35 U.S.C. § 103(a) as being unpatentable over the Lim et al. reference in view of the Jerng and Matero references.

The present invention pertains to a multiband receiving apparatus. Independent claims 1, 6, and 10-14 of the present invention include novel combinations of elements which include “a voltage controlled oscillator including a varactor,” and “a phase locked loop for receiving a reference frequency signal and a signal output from the voltage controlled oscillator and for generating a control voltage, input to the varactor, for controlling the frequency of the signal output from the voltage controlled oscillator.” Similarly, independent method claim 17 of the present invention recites a “receiving a reference frequency signal and a signal output from a voltage controlled oscillator including a varactor and generates a control voltage, input to the varactor, that controls a frequency of the signal output from the voltage controlled oscillator.”

The separate, but intimately interrelated, voltage controlled oscillator (VCO) and phase locked loop (PLL) of the present invention may be better understood from original FIG. 2, which is reproduced below.



At page 2, lines 12-18, of the Office action, the Examiner refers to FIG. 8 of the Lim et al. reference and asserts that this drawing shows, “a phase locked loop 222 for receiving a frequency signal 218 and a signal output 454.” Figure 8 of the Lim et al. reference is reproduced below.

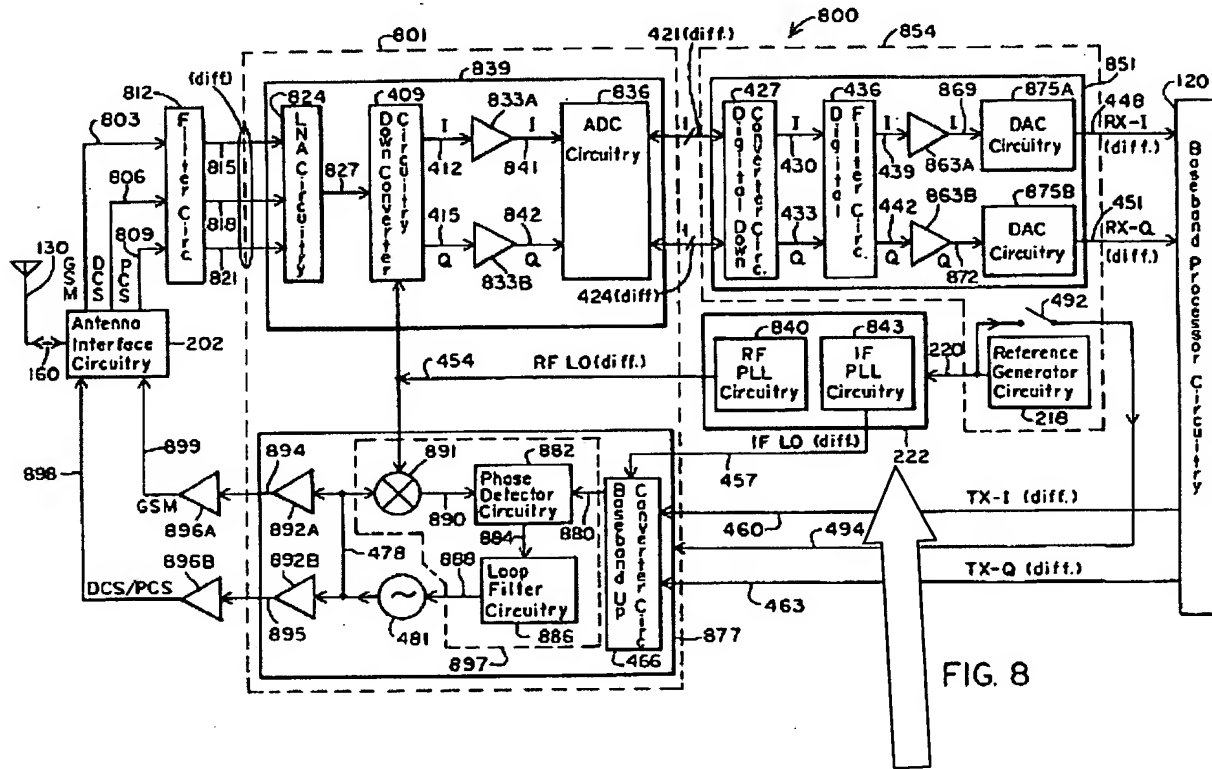


FIG. 8

PLLs are internal components of oscillator circuitry 222

The Lim et al. reference at column 14, lines 51-57, states: "The local oscillator circuitry 222 includes RF phase-lock loop (PLL) circuitry 840 and intermediate-frequency (IF) PLL circuitry 843. The RF PLL circuitry 840 produces the RF local oscillator, or RF LO, signal 454, whereas the IF PLL circuitry 843 produces the IF local oscillator, or IF LO, signal 457."

Feature 222 in FIG. 8 of the Lim et al. reference is thus an oscillator circuit that may be analogized to the VCO of the present invention. Although FIG. 8 of the Lim et al. reference may show internal PLL circuitry as components of the VCO, there is no teaching or suggestion in the Lim et al. reference of "a phase locked loop for receiving a reference frequency signal and a signal output from the voltage controlled oscillator," such as is set forth in independent claims 1,

6, and 10-14 of the present invention. That is, the Lim et al. reference fails to disclose or suggest a PLL circuit that is separate from the VCO and can input/output with the VCO.

At page 2, line 13, of the Office action, the Examiner asserts that the Lim et al. reference teaches a varactor. The relevant passage at column 37, lines 35-43, of the Lim et al. reference, states:

This reduction in the required capacitance variation eliminates the need for a large capacitance variation that typically requires the use of a variable reverse-biased diode (or varactor), as conventional VCO circuitries employ. Avoiding a large capacitance variation in turn results in reduced noise susceptibility. By eliminating the need for a varactor, the present invention provides a frequency synthesis solution suitable for integration in a single CMOS integrated circuit.

This passage in the Lim et al. reference, utilized by the Examiner, teaches that varactors are a disadvantage to be avoided. As a result, the Lim et al. reference not only fails to teach or suggest a varactor as part of the local oscillator circuit 222 in FIG. 8, but instead teaches away from using a varactor to tune oscillation frequency in a VCO.

A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984). It is improper to combine references where the references teach away from their combination. *In re Grasselli*, 713 F.2d 731, 743, 218 USPQ 769, 779 (Fed. Cir. 1983). A *prima facie* case of obviousness may also be rebutted by showing that the art, in any material respect, teaches away from the invention. *In re Geisler*, 116 F.3d 1465, 1471, 43 USPQ2d 1362, 1366 (Fed. Cir. 1997).

In this case, the Lim et al. reference utterly fails to teach or suggest a varactor in the local oscillator circuitry 222 of FIG. 8. Instead, the Lim et al. reference considers varactors as a noise-creating disadvantage, which thus teaches away from the present invention.

At page 2, line 18, to page 3, line 2, of the Office action, the Examiner unequivocally admits to additional failures of the Lim et al. reference, including the failure to disclose a low noise amplifier. The Examiner then turns to the Jerng and Matero references for teachings pertaining to low noise amplifiers and down converters.

With respect to claim 1, at page 3, lines 7-10, of the Office action, the Examiner asserts that the Matero reference discloses a "low noise amplifier 58" for receiving the control voltage, for operating at a frequency band that is adjusted by the control voltage, and for amplifying a received signal while suppressing a noise signal in the received signal. However, in Fig. 3 and Fig. 4 of the Matero reference, the amplifier 58 only receives an AGC signal. Also, the signal from PLL 50 is only input to VCO 48 and is not input to amplifier 58. Thus, the Matero reference fails to disclose or suggest that a low noise amplifier receives the control voltage from the phase locked loop, operates at a frequency band that is adjusted by the control voltage, or amplifies a received signal while suppressing a noise signal in the received signal.

With respect to Claim 6, at page 5, lines 1-3, of the Office action, the Examiner asserts that the Matero reference discloses a "power amplifier 58" for receiving the control voltage, for operating with a gain that is adjusted by the control voltage, and for amplifying the converted signal by the adjusted gain. However, in Fig. 3 and Fig. 4 of the Matero reference, the amplifier 58 receives only an AGC signal. Also, the signal from PLL 50 is input to only VCO 48 and is not input to amplifier 58. Thus, the Matero reference fails to disclose or suggest that a power amplifier receives the control voltage from the phase locked loop, operates with a gain that is adjusted by the control voltage, or amplifies the converted signal by the adjusted gain.

Additionally, the multiband transmitting and receiving apparatus of Claim 10 includes the low noise amplifier and the power amplifier set forth in Claim 1 and Claim 6, respectively.

Thus, for the reasons analogous to those discussed above with respect to Claim 1 and Claim 6, the Matero reference fails to disclose or suggest that a low noise amplifier receives the control voltage from the phase locked loop, operates at a frequency band that is adjusted by the control voltage, or amplifies a received signal while suppressing a noise signal in the received signal or that a power amplifier receives the control voltage from the phase locked loop, operates with a gain that is adjusted by the control voltage, or amplifies the converted signal by the adjusted gain.

With respect to Claim 17, for the reasons analogous to those discussed above with respect to Claim 6, the Matero reference fails to disclose or suggest receiving the control voltage that controls a frequency of the signal output from the voltage controlled oscillator to adjust the gain or amplifying the converted signal by the adjusted gain.

Moreover, the teachings of Jerng and Matero references fail to address the deficiencies of the Lim et al. reference in teaching or suggesting “a voltage controlled oscillator including a varactor,” such as is set forth in all the independent claims (claims 1-6, 10-14 and 17) of the present invention, or “a phase locked loop for receiving a reference frequency signal and a signal output from the voltage controlled oscillator and for generating a control voltage, input to the varactor, for controlling the frequency of the signal output from the voltage controlled oscillator,” such as is set forth in independent claims 1, 6, and 10-14 of the present invention.

As a result, a person of ordinary skill in the art would not be motivated by the combination of the Lim et al. reference with the Jerng reference and the Matero reference (or the combination of the Lim et al. reference with any of the other applied references) to render independent claims 1-6, 10-14 or 17 *prima facie* obvious. Claims that depend upon any of these independent claims are patentable for at least the above reasons.

For the above reasons, applicants submit that this rejection over the Lim et al. reference in view of the Jerng reference and the Matero reference has been traversed, and reconsideration and withdrawal thereof is respectfully requested.

C. Asserted Obviousness Rejection of Claims 2, 3, 9, and 15

In the outstanding Office action, the Examiner rejected claims 2, 3, 9, and 15 under 35 U.S.C. § 103(a) as being unpatentable over the Lim et al. reference, the Jerng reference and the Matero reference in view of the Komori et al. reference.

The Komori et al. reference fails to remedy the deficiencies of the Lim et al., Jerng, and Matero references.

Claims 2 and 3 depend from independent claim 1. Hence, claims 2 and 3 are at least allowable as depending from an allowable base claim, namely independent claim 1, which includes allowable subject matter that is neither taught nor suggested in the references of record. Accordingly, applicants respectfully request favorable reconsideration and withdrawal of the rejection of claims 2 and 3 under 35 U.S.C. § 103(a) based on the Lim et al., Jerng, Matero, and Komori et al. references.

Claim 9 depends from independent claim 6. Hence, claim 9 is at least allowable as depending from an allowable base claim, namely independent claim 6, which includes allowable subject matter that is neither taught nor suggested in the references of record. Accordingly, applicants respectfully request favorable reconsideration and withdrawal of the rejection of claim 9 under 35 U.S.C. § 103(a) based on the Lim et al., Jerng, Matero, and Komori et al. references.

Claim 15 depends from independent claim 14. Hence, claim 15 is at least allowable as depending from an allowable base claim, namely independent claim 14, which includes allowable subject matter that is neither taught nor suggested in the references of record.

Accordingly, applicants respectfully request favorable reconsideration and withdrawal of the rejection of claim 15 under 35 U.S.C. § 103(a) based on the Lim et al., Jerng, Matero, and Komori et al. references.

D. Asserted Obviousness Rejection of Claims 4 and 7

In the outstanding Office action, the Examiner rejected claims 4 and 7 under 35 U.S.C. § 103(a) as being unpatentable over the Lim et al., Jerng, and Matero references in view of the Davis et al. reference.

The Davis et al. reference fails to remedy the deficiencies of the Lim et al., Jerng, and Matero references.

Claim 4 depends from independent claim 1. Hence, claim 4 is at least allowable as depending from an allowable base claim, namely independent claim 1, which includes allowable subject matter that is neither taught nor suggested in the references of record. Accordingly, applicants respectfully request favorable reconsideration and withdrawal of the rejection of claim 4 under 35 U.S.C. § 103(a) based on the Lim et al., Jerng, Matero, and Davis et al. references.

Claim 7 depends from independent claim 6. Hence, claim 7 is at least allowable as depending from an allowable base claim, namely independent claim 6, which includes allowable subject matter that is neither taught nor suggested in the references of record. Accordingly, applicants respectfully request favorable reconsideration and withdrawal of the rejection of claim 7 under 35 U.S.C. § 103(a) based on the Lim et al., Jerng, Matero, and Davis et al. references.

E. Asserted Obviousness Rejection of Claims 11, 12, and 19

In the outstanding Office action, the Examiner rejected claims 11, 12, and 19 under 35 U.S.C. § 103(a) as being unpatentable over the Lim et al. reference in view of the Komori et al. reference.

For at least the reasons analogous to those discussed above in section B above, the Lim et al. reference fails to disclose or suggest an apparatus as recited in claims 11 and 12. Applicants respectfully submit that the Komori et al. reference, as applied to claims 11 and 12, fails to compensate for all of these deficiencies.

With respect to Claim 11, at page 15, lines 11-14, of the Office action, the Examiner asserts that the Komori et al. reference discloses an LC resonance circuit including an inductor and a capacitor, wherein the capacitance of the capacitor is adjusted using the control voltage provided by the phase locked loop to thereby change a resonance frequency of the LC resonance circuit (Fig. 1). However, Fig. 1 of the Komori et al. reference typically shows a conventional voltage controlled oscillator (column 1, lines 18-19) and is not related to the low noise amplifier. Thus, the Lim et al. reference and the Komori et al. reference individually or in combination, fail to disclose or suggest that a low noise amplifier used in an RF transceiver comprises an LC resonance circuit including an inductor and a capacitor, wherein a capacitance of the capacitor is adjusted using the control voltage provided by the phase locked loop to thereby change a resonance frequency of the LC resonance circuit.

With respect to Claim 12, at page 16, lines 4-8, of the Office action, the Examiner alleges that the Komori et al. reference discloses an amplifier Fig. 1 an LC resonance circuit having a cascade structure having a plurality of terminals and including an inductor and a capacitor, wherein the capacitance of the capacitor is adjusted using the control voltage provided by the phase locked loop to thereby change a resonance frequency of the LC resonance circuit, which can adjust the gain of the power amplifier. However, Fig. 1 of the Komori et al. reference typically shows a conventional voltage controlled oscillator (column 1, line 18-19) and is not related to power amplifier. Thus, the Lim et al. reference and the Komori et al. reference,

individually or in combination, fail to disclose or suggest that a power amplifier used in an RF transceiver comprises an LC resonance circuit having a cascade structure having a plurality of terminals and including an inductor and a capacitor, wherein the capacitance of the capacitor is adjusted using the control voltage provided by the phase locked loop to thereby change a resonance frequency of the LC resonance circuit and adjust the gain of the power amplifier.

For at least these reasons, applicants respectfully submit that the Lim et al. reference and the Komori et al. reference, individually or in combination, fail to suggest, much less disclose, all of the element of an apparatus as claimed in independent claims 11 and 12. Accordingly, applicants respectfully request that the rejection of claims 11 and 12 under 35 U.S.C. § 103(a) be withdrawn.

Claim 19 depends from independent claim 17. Hence, claim 19 is at least allowable as depending from an allowable base claim, namely independent claim 17, which includes allowable subject matter that is neither taught nor suggested in the references of record. Accordingly, applicants respectfully request favorable reconsideration and withdrawal of the rejection of claim 19 under 35 U.S.C. § 103(a) based on the Lim et al. and Komori et al. references.

F. Asserted Obviousness Rejection of Claim 13

In the outstanding Office action, the Examiner rejected claim 13 under 35 U.S.C. § 103(a) as being unpatentable over the Lim et al. reference in view of the Jerng reference.

Claim 13 has been canceled, thereby rendering this rejection moot. Accordingly, applicants respectfully request that the rejection of claim 13 under 35 U.S.C. § 103(a) be withdrawn.

G. Conclusion

The remaining documents cited by the Examiner were not relied upon to reject the claims. Therefore, no comments concerning these documents are considered necessary at this time.

If the Examiner believes that additional discussions or information might advance the prosecution of the instant application, the Examiner is invited to contact the undersigned at the telephone number listed below to expedite resolution of any outstanding issues.

In view of the foregoing amendments and remarks, reconsideration of this application is earnestly solicited, and an early and favorable further action upon all the claims is hereby requested.

Respectfully submitted,

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PETITION and
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This document and any concurrently filed papers are believed to be timely. Should any extension of the term be required, applicant hereby petitions the Director for such extension and requests that any applicable petition fee be charged to Deposit Account No. 50-1645.

If fee payment is enclosed, this amount is believed to be correct. However, the Director is hereby authorized to charge any deficiency or credit any overpayment to Deposit Account No. 50-1645.

Any additional fee(s) necessary to effect the proper and timely filing of the accompanying-papers may also be charged to Deposit Account No. 50-1645.